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Review of Silacci, Beebe Family Ranch, Wilson Beebe, and Valley Ford (Briggs) Tire Sites
Petaluma, CA

Dear Bob:

As you requested, we have conducted an engineering evaluation of the site restoration projects undertaken by the landowners at the above sites, in an attempt to ascertain whether the projects were completed in accordance with their engineer-approved plans, and any engineer-approved change orders or addendums. Requests were made in all cases for "as-built" drawings to be provided, reflecting the incorporation of changes to the completed projects. This evaluation was conducted in two stages: (1) an initial surface inspection of the sites to confirm (to the extent possible) that the projects were actually performed in accordance with the final plans; and (b) follow-up inspections to evaluate the performance of the erosion control/slope stability features after seasonal storms have impacted these sites, to determine if the sites performed within expectations for the design chosen by each landowner (as such analysis provides further indication of whether the projects were performed to specifications).

The four sites are:

- Silacci Legacy Tire Site at 6157 Lakeville Highway
- Beebe Family Ranch at 4223 Adobe Road
- Wilson Beebe Waste Tire Site at 8980 Roblar Road
- Valley Ford Briggs Waste Tire Site at 12528 Valley Ford Road

This letter is divided into four sections: 1) the review of the restoration plans and as-built reports based on inspections of the sites; 2) Any observations on the erosion conditions at the sites prior to the December 30-31 storm event; 3) An overview of the December 30-31 storm event; and 4) Observations on the erosion conditions at the sites following the December 30-31 storm event.



Restoration Work Review

Silacci – Legacy Tire Site: I initially visited the Silacci site on December 7, 2005 and visually inspected the areas shown on the As-Built drawing prepared by CSW/Stuber-Stroeh Engineering Group, Inc. The drainage elements at the two sites, Sites A and B, and downstream along the drainage swale were all in place as shown on the As-Built Plan. Sites A and B had both been regraded, as shown, and had been seeded. The grass was well established over disturbed areas at both sites.

The As-Built Plan does show a couple changes that are different from the approved Grading and Drainage Plans. The Grading Plan accurately depicted the extent of the tire piles at both sites. However, on the As-Built Plan, the limits of the tire pile at Site A has been inaccurately extended downstream of the actual tire pile. The Grading Plan called for riprap at the outlets of the two sites; this rip-rap was not installed, and is not shown on the As-Built plan. The final grading contours of Site A shown on the As-Built Plan do not match the Grading Plan contours for this area. The grades are up to 8 feet lower over the central area of Site A. At Site B, the final grading contours directly over the tire removal area are within 1 to 2 feet of the design. Downstream of the tire removal area a wedge of fill up to 8 feet deep was placed in the existing channel. ERRG has no documentation or revised plans showing if these changes to the design had been approved or if the full plan was not fully implemented.

The attached photographs, S1 and S2 show Site A shortly after the restoration work was completed. S3 shows Site B after restoration work was completed. These photos were taken prior to my visit.

Beebe Family Ranch: I initially visited the Beebe Family Ranch site on December 14, 2005 and visually inspected the North, Middle, and South pile areas discussed in the Project Work Plan and the “Memorandum of Changes During Construction for Beebe Family Ranch Project” prepared by EBA Engineering for the Beebe Family Ranch on November 18, 2005. The stream channel and slopes in the area in the North, Middle, and South pile areas had all been restored following the original project plans and the changes outlined in the Memorandum. The slopes had been graded and vegetative blankets and wattles were put in place for erosion control. Drain rock has been placed along the channel bed in the North Pile area. Check dams had been installed along all three areas. The mitigation pond berm had been constructed west of the Lower Pile area. The new outfall from the stock pond is in place with a rock check dam at the outlet into the drainage course.

The perimeter ditch, the drop inlets along the ditch, piping and riprap outfalls into the main channel shown on the figures in the November 18th Memorandum were not installed. Following the visit, this was brought to the attention of EBA Engineering. EBA reissued the Memorandum on January 23, 2006 which addressed these changes as part of the new mitigation pond construction and grading.



The attached photographs, B1 and B2, show the North Pile area with rock blanket layer and Middle Pile area grading after the bulk of the restoration work was complete. These photos were also taken prior to my visit.

Wilson Beebe and Briggs: Currently, ERRG has not received any documentation on the restoration plan and as-built for the Wilson-Beebe and the Briggs sites, so they will not be addressed.

Pre-Storm Event Erosion

Only the Silacci and Beebe Family Ranch sites were visited prior to the New Year's storm event and the heavy rains throughout most of December. Both sites had received rainfall within the weeks prior to the visit. Neither site showed any erosion impacts due to the storm events in the area.

December 30-31, 2005 Storm Event

Jenifer Beatty of Levine - Fricke compiled the following information about the December 30-31 Storm Event:

Heavy rains in December 2005, particularly in the last week of December 2005, resulted in flooding and associated erosion throughout Sonoma County. A series of storms from Christmas Day through New Year's Day brought heavy to excessive amounts of precipitation across northern California resulting in widespread flooding. The Russian and Napa Rivers took the brunt of the excessive precipitation during the December 30-31, 2005 storm event.

The rain gage located at the California Department of Forestry (CDF) Santa Rosa station recorded 5.28 inches in the 48 hour period from December 30, 2005 to January 1, 2006. According to Sonoma State University's weather station, Rohnert Park received 5.8 inches of rain from 3AM on December 30th to 8AM December 31st. Based on that station data, the storm exceeded the "100-year flood event" for Rohnert Park by a wide margin for durations of 8 hours and longer. Also, data collected by the California Department of Water Resources (DWR) 8-station index, an average of 8 rain gages located along the northern Sierra Nevada between Lake Shasta to the north and the American River basin to the south, recorded 25.8 inches of rain in December 2005, making this past December the 4th wettest month for all months since records for the 8-station index began in 1920.

The Napa and Sonoma region suffered more flooding following this event than many other communities, according to Gary Bardini, DWR's Chief of Hydrology. The December 30-31 rain event resulted in overbank flooding and excessive peak flows in local streams that contributed to considerable bed and bank channel erosion, surficial landslides, and erosion of unimproved roads in the area. Peak flows in Sonoma Creek (Agua Caliente gauge) were estimated at approximately



18,000 cubic feet per second (cfs). This event is the highest event recorded over the fifty year period of record, and at a minimum it is considered between a fifty year and one hundred year flood event. Recent channel surveys conducted by Laurel Collins for the Sonoma Ecology Center following the event show significant changes in channel cross section and evidence of both severe erosion and areas of considerable sedimentation.

"When you look at the Napa and Sonoma area, the location does not have a set of reservoir systems and unfortunately is not able to handle peak rainfall, which translated into some urban flooding for that community," Bardini said. Farmer Bill Eiler, who grows hay and small grains, experienced quite a bit of damage from high water including debris, field erosion and bank erosion.

"We have tree limbs, logs, gravel, sediment and trash spread over about 125 acres of our ranch that will need to be removed," Eiler said. "Field erosion happened on approximately 10 acres that will need to be re-leveled. Many of our graveled roads are silted over or washed out. We will need to grade and apply new gravel to these roads. We also have three bank erosion areas, which will need considerable repair."

President Bush declared Sonoma County and eight other California counties disaster areas due to the severe floods that inundated parts of the state, including Petaluma. The assistance offered can include grants to pay for temporary housing or home repairs and low-interest loans to help businesses and homeowners pay for losses not fully covered by insurance.

Sources:

California Farm Bureau Federation; "Officials Evaluate Flood Damage, Seek Aid," Christine Souza, January 11, 2006; National Weather Service,

City of Rohnert Park, Current Issues, 2006,

Petaluma Arugs Courier, Monday February 6, 2006.

Post-December 30-31, 2005 Storm Event

Following the December 30-31 storm, ERRG was asked to review the erosional impact on the work areas at the four sites. The Silacci and Beebe Ranch sites were visited on January 12, 2006. The visits to the Briggs and Wilson Beebe sites took place on January 18, 2006.

Silacci – Legacy Tire Site: At the Silacci site, there was erosion due to the storm at both of the tire removal areas. Not all of the tires were removed from these areas. Embedded tires were left undisturbed at the bottom of both fill areas except in one small portion of the Site B tire area. In this small area, it was necessary to temporarily remove the tires down to bare soil in order to provide a stable base for the excavation of the main tire pile. These tires were replaced upon



completion of the removal work in the area, and then buried during the backfill and restoration efforts. The areas directly above these remaining tires showed no evidence of erosion and held up well. However, erosion at the site took place downgradient of the tire areas, in the areas where the surface flow was concentrated as it was directed into the existing drainage channels leading to the main drainage channel through the site. These are the areas where you would most likely expect erosion do to the higher flow velocities in the smaller cross-sectional areas, and these are the areas where the Grading and Drainage Plans had proposed the placement of rip rap as part of the erosion control features.

At the eastern area, Site A, the significant erosion took place along the western side of the channel extending approximately 50 feet. Several channels were cut into the ground surface covering a triangular area approximately 10 feet wide at the top narrowing down to approximately 2 feet wide as the separate channels came together. The depths ranged from 6 inches to about 2 feet at the deepest point. This erosion took place at the proposed rip rap location. The installation of the proposed rip rap might have significantly reduced the erosion damage at this location. Attached photos, S4 and S5, show the erosion at Site A.

At the western area, Site B, the erosion was a single channel approximately 100 feet long, 6 to 12 inches deep, and approximately a foot wide. This channel started well below the footprint of the original tire locations, and appears to have cut into the wedge of fill placed in this area. In this case, the erosion took place downstream of the proposed rip rap location. The installation of the rip rap may not have significantly changed the erosion in this area. Attached photo, S6, shows erosion at Site B.

We were additionally requested to examine the landowner's contention that had he been permitted to leave substantially more layers of tires the site would not have been impacted to the same degree by the December 30-31, 2005 storm event. The thickness of the buried tire layer should have no impact on the erosion at the surface, as the surface erosion is related to slope and the compaction of the cover soils. If the slopes were restored to the grading plan contours and met the compaction required in the minimum 4-foot cover, the subsurface thickness of any layer of tires would have no effect on the surface erosion.

At Site A, the as-built grading has changed from the Grading Plan design. The finished grade in the central portion of the tire area is approximately 8 feet lower than the design grades. However, none of the final slopes are steeper than the design slopes, and these changes have reduced the slope directly over the bulk of the tire area. This would lead to lower velocity of the flow through the central portion of the tire area and potentially reduce the chance for erosion. The existing slope at the edge of the cover where the erosion was observed is similar to the design grading.

At site B, the as-built grades over the tire removal area are within 1 to 2 feet of the proposed grading plan, so the removal of any extra tires from this site had no impact.

As stated above, neither of the areas directly above the buried tires showed evidence of surface erosion and held up well.



As we have not reviewed the compaction testing performed during the course of fill placement, it is an open question as to whether there are any compaction issues with respect to the soils deposited in the fill area.

Beebe Family Ranch: At the Beebe Family Ranch, there was erosion mainly confined along the main channel through all three areas. In the North Tire area, a deep flow path had been cut through the surface rock blanket layer in the floor of the restored channel and into the soil layers below. The Middle and South areas had shallower flow paths cut into the surface of the channel. The rock check dams held up and are still in place. There was some soil slippage from the east bank in a few locations, but very localized. The east bank was not disturbed during the tire removal and did not receive any regrading during the restoration process. The west bank which had extensive regrading and restoration work done, held up well.

The attached photo, B3, shows the channel cut through the rock blanket layer in the North Pile area. Photo B4, shows the shallow channel cut through the Middle Tire area.

The appearance of smaller channels on the flat bottom of the restored stream similar to those in the Middle and South areas is not unexpected and would have most likely developed in time. The storm event speeded up the process. In the North Area, greater flow velocities were anticipated as indicated by the design and installation of the rock blanket layer. The depth of the cuts through that layer were more than you would expect based upon the erosion controls in place.

Valley Ford Briggs: At the Briggs site, the major erosion took place away from the main restoration area. The main channel was not impacted by the storm events. This channel had been regraded and rock check dams installed at intervals along the length. The only erosion damage along the main channel was at one section of the side slope of the main channel where surface flow from the adjacent pasture had cut down into the bank on the north side.

The majority of the erosion damage at the Briggs site was in the east tributary that enters the main channel at the east end of the restoration area. This ditch had only jute matting placed on the slopes and bottom and temporary hay bales placed at intervals along the ditch. During the storm, several areas had soil eroded out from underneath the matting, and hay bales pushed down stream, the bottom of the ditch had been cut down a foot or more in spots.

Photo VF1 shows the main channel after the storm event, Photo VF2 shows the east tributary erosion.

We did not go to the other tire removal location at the Briggs site during this visit, so can not address any erosion in that area.

Wilson Beebe: At the Wilson Beebe site, the restoration to the tire removal area on the east side of the property held up well. The rock in the channel and the two basin areas showed little effect from the storm. There was a small slide on the upper end of the upper basin that will need to be repaired. Photos, WB1 and WB2, show the west side drainage elements. Photo WB3 shows the upper basin on the east side.



The restoration work on the west side of the property had more impacts from the storm events. Again, the main channel and basin held up well. There was one location adjacent to the main channel that was damaged by the storm. The soil around a subdrain pipe feeding into the channel has been washed out, leaving a 2 foot wide cut that was up to 3 feet deep as it cut back into the bank. The jute matting covering the bank is suspended over this cut.

East of the main channel, two gullies where tires had been removed had been backfilled up to the surrounding grade. The surface soils showed signs of erosion with channels cut across the surface up to 6 inches deep. These areas could continue to erode if not addressed.

The attached photo WB4 shows the main west channel and WB5 shows the area adjacent to the west channel, above the west basin.

I hope the information in this letter addresses your needs. Please contact me at (925) 726-4115, if you have any further questions.

Sincerely,

Peter D. Loveridge, P.E.
Project Engineer
PDL/pdl

Silacci Legacy Tire Site



S1- Silacci Site A restoration grading completed.



S2 - Silacci Site A complete and hydroseeded. Area shown is slope dropping into outlet channel. Rip rap proposed at bottom of slope not installed.



S3 - Silacci Site B restoration grading completed and hydroseeded.



S4 - Silacci Site A after December 30-31, 2005 storm event. Erosion at downstream edge of tire pile area on slope dropping into outlet channel.



S5 - Silacci Site A after December 30-31, 2005 storm event looking downstream to outlet channel. Rip rap was proposed at the bottom of slope where channel narrows.



S6 - Silacci Site B erosion from December 30-31, 2005 storm event. Erosion downstream of tire removal area.

Beebe Family Ranch Tire Site



B1 - Beebe Ranch north tire pile area completed with rock.



B2 - Beebe Ranch middle tire pile area at final grade.



B3 - Beebe Ranch North tire area after December 30-31, 2005, storm event. Erosion 1-2 feet deep noted in channel bottom.



B4 - Beebe Ranch Middle tire area after December 30-31, 2005 storm event. Erosion ~ 1-foot deep in channel bottom.

Valley Ford Briggs Tire Site



VF1 - Valley Ford (Briggs) main drainage channel. Property owner indicated water flowed 10' deep in channel during December 30-31 storm event



VF2 - Valley Ford (Briggs) east tributary drainage erosion after the December 30-31, 2005 storm event

Wilson Beebe Tire Site



WB1 - Wilson Beebe West side after December 30-31, 2005, storm event.



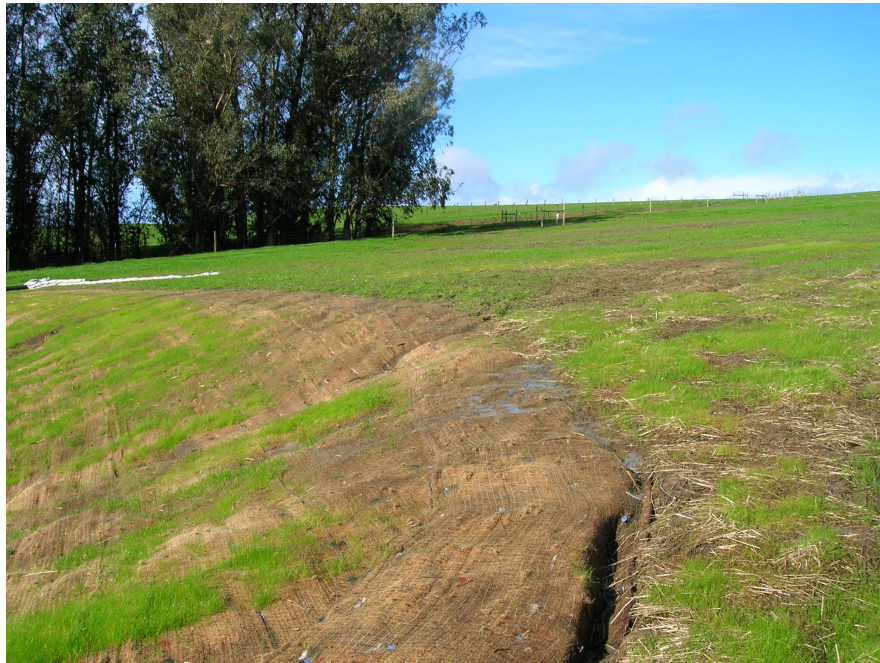
WB2 - Wilson Beebe West side after December 30-31, 2005, storm event.



WB3 - Wilson Beebe West side after December 30-31, 2005, storm event. Erosion above cut slope.



WB4 - Wilson Beebe east side rock lined drainage after December 30-31, 2005 storm.



WB5 - Wilson Beebe east side area showing change in slope and placement of erosion control blanket for slope protection. Picture taken after after December 30-31, 2005 storm.